LIFTING AND SEATING DEVICE

Inventor: Richard Edmond Fletcher, Leominster (GB)

Correspondence Address:
CHERNOFF, VILHUAER, MCCLUNG & STENZEL
1600 ODS TOWER
601 SW SECOND AVENUE
PORTLAND, OR 97204-3157 (US)

Assignee: Mangar International Limited

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ABSTRACT

An apparatus for lifting a person from a supine position on the ground to a sitting position above ground level comprising at least one inflatable ring structure having a hollow, a flexible membrane and a collapsible support element, wherein the flexible membrane extends over at least a portion of the hollow to provide a seating surface for the person and the collapsible support element when erected projects in a substantially upward direction to support the person.
LIFTING AND SEATING DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

BACKGROUND OF THE INVENTION

[0001] This invention relates to apparatus for raising and lowering persons. More specifically the invention relates to a device for raising a person from ground level and positioning the person up to a sitting position at chair level.

[0002] The invention has been devised primarily for use in assisting disabled, injured or infirm persons who may have fallen to the ground and need to be raised and assisted into a sitting position. Such persons may be manually lifted by other persons, however, this method usually requires more than one lifter and there are risks of injury to the lifter(s), especially if the person to be lifted is heavy.

[0003] Equipment such as hoists may be employed, however, these can be awkward and time-consuming to set up and are frequently not portable. There are also devices similar to powered sack-trucks fitted with appropriate seating that will lower to ground level but these devices, as with hoists, are not readily available to the point of need where a person has fallen.

[0004] Inflatable lifting cushions may also be employed to lift persons from ground level, but known devices require the person to be manually assisted into a sitting position before being elevated. Additionally, if the person cannot physically maintain a sitting posture, assistance in maintaining posture is required of the lifter. The applicant has patents for a pneumatically powered back rest, U.S. Pat. Nos. 2,301,028 and U.S. Pat. No. 5,970,545. These patents disclose a device to lift a person from a supine to a sitting position, however, the device is intended for use on a bed and therefore the sitting position achieved is that in which the legs are substantially horizontal as they are supported by the bed. The applicant also has a patent for a pneumatic lifting device, U.S. Patent No. 2,296,429 comprising an inflatable seating structure and a backrest. This device requires the assistance of a lifter to assemble the device ready for use and to steady the person when being raised.

SUMMARY OF THE INVENTION

[0005] The subject invention provides a structure, and method of manufacturing it, having one or more inflatable rings which can be used to lift a person from a supine position on the ground to a sitting position above ground.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0006] FIGS. 1a and 1b are perspective views of the apparatus in the raised position;

[0007] FIGS. 2 to 6 are perspective views of the apparatus at various stages of operation; and

[0008] FIG. 7 is a perspective view of an inflatable ring structure.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

[0009] FIGS. 1a and 1b show the apparatus in a raised position above ground level. The apparatus comprises three ring structures 1 of rectangular shape stacked on top of one another. Each ring structure 1 has a central hollow 6, also of rectangular shape. The ring structures 1 may all be of the same size or decrease in size towards the top of the stack. Although, the inflatable ring structures shown are all of a rectangular form it must be understood that ring structures having other forms, for example, circular or square forms may also be employed. The ring structures 1 are made of tubular structures 20 the construction of which shall be described below in more detail. The ring structures 1 may be permanently attached to each other by welding or other means. Typically, the structures 1 are made of a flexible plastics material.

[0010] A flexible membrane 7 is releasably attached to the top most ring structure 1 so that it covers part of the hollow 6 of the stack of structures. The flexible membrane 7 extends across the hollow to provide a seating surface for the user. The membrane 7 is provided with ridges 75 to reduce the risk of the user slipping over the membrane. The flexible membrane is attached to the upper most inflatable ring structure along three edges, two side edges A and B and a front edge C. Attached to the flexible membrane 7 along back edge D is a back support member 8. The back support member 8 comprises a back panel 9 and a support panel 10. The back panel 9 and support panel 10 shown are both inflatable structures, however, the back panel 9 may comprise a rigid structure. In FIG. 1a, the back panel 9 is collapsed and is shown lying on top of the collapsed support panel 10. In this state the flexible membrane 7 sags into the hollow 6.

[0011] In FIG. 1b, the back support member 8 is inflated. The support panel 10 rests on the upper most ring structure 1 and supports the back panel 9 which is inflated to a substantially upright position. The back panel 9 is generally of the same width as the upper most inflatable ring structure 1 and abuts with the flexible membrane 7 and the support panel 10. The support panel 10 is releasably attached to the upper most ring structure 1.

[0012] Since the flexible membrane 7 is connected to the back panel 9, the membrane 7 is raised from an initial sagging position in the hollow 6 to form a flat seating surface across the hollow 6 as the back support member 8 is inflated. The panels 9 and 10 are arranged in an inverted “Y” configuration and may be inflated together or individually through apertures (not shown). Panels 9 and 10 in the “Y” configuration stand over a portion 60 of the hollow which is not covered by the membrane 7. This can be more easily seen in FIGS. 5 and 6.

[0013] FIGS. 2 to 6 show the apparatus being used to raise a person 11 from a supine position on the ground to a sitting position above ground level. The ring structures 1 each have an aperture 2 to allow fluid, such as air, to enter and exit the structures and are each provided with air hoses 3 which may be attached to an air or other suitable fluid supply (not shown).

[0014] As shown in FIG. 2, a person 11 on the ground in a supine position is firstly maneuvered onto the apparatus in a deflated or collapsed position. This may be achieved by, for example, a log roll. The person’s head 13 is aligned with the deflated back support member 8 and the person’s body and upper legs 14 are positioned centrally on the flexible membrane 7. The lower legs are shown unsupported by the
apparatus, however, the apparatus may be provided with rigid support members protruding from the uppermost ring structure to support the legs.

0015 The lowest ring structure 1 is then inflated until it is rigid as shown in FIG. 3. The second and uppermost rings are then sequentially inflated up to a rigid state as shown in FIG. 4. Alternatively, the ring structures 1 may be inflated in any sequence. Since the flexible membrane 7 sags into the hollow 6 of the center of the uppermost ring structure 1, the person 11 remains safely cradled in the center of the apparatus and is restrained from rolling from side to side as the apparatus raises the person from the ground. No external steadying force is needed.

0016 When all three ring structures 1 have been inflated, the back support member 8 can be inflated. Upon inflation of the back support member 8, the flexible membrane 7 is pulled taut across the hollow 6 in consequence of being attached to the support member 8 and thus then provides a firmer sitting base for the person 11. The back support member 8 presses against the person 11 easing the person into a supported sitting position. The inflation of the back support member 8 is shown in FIGS. 5 and 6.

0017 An alternative sequence of lifting can commence with fully inflating the back support member 8 to sit the person up. The ring structures 1 are then inflated sequentially starting with the lowest one. In this case, the flexible membrane 7 remains slack whilst the uppermost ring 1 is not fully inflated, thereby forming a hollow into which the person sinks for secure support. Full inflation of the uppermost ring tightens the membrane to provide a substantially level sitting surface.

0018 The air hoses 3 may be attached to a hand control which can be operated by the person 11 himself. The air supply may be a compressed air supply having a cut off pressure to protect the apparatus from too high a pressure.

0019 From the sitting position on the apparatus, the person 11 can then more easily get up onto his or her feet, or transfer to a wheelchair.

0020 FIG. 7 shows a portion of a tubular structure 20 which is used to construct each corner of a rectangular ring structure 1. The tubular structure 20 comprises two shell panels, an upper shell panel 18 and a lower shell panel 19 welded to each other along seam 21 and a gusset 17 which is positioned centrally between the two shell panels 18, 19 along an axial length of the tubular structure 20. The gusset is positioned on the innermost side of the corner of the structure 1. The gusset 17 is attached to the two shell panels 18, 19 by welding. The addition of the gusset 17 creates two welds 15, 16 either side of the central axial line 14 of the gusset 17. For the purpose of this application the term gusset is taken to mean a panel of material which is used as an insert to strengthen the structure of the tubular structure. The gusset may have various forms and shapes. By central axial line it is meant a line perpendicular to the major axis of the corner or bend of the tubular structure, midway between two axial extremities of the structure, the two axial extremities being considered in the same plane as the major axis.

0021 The stress on a unit length of the weld 15 at an internal corner of the structure is produced by the force, or forces within the structure acting on the area subtended by the unit length of weld as shown by the dashed lines in FIG.
9. Apparatus as claimed in claim 8 wherein at least one of the two members comprises an inflatable structure.

10. Apparatus as claimed in claim 8 wherein upon erection the two members are arranged in an inverted "Y" arrangement.

11. Apparatus as claimed in claim 1 comprising a series of inflatable ring structures stacked on top of one another.

12. Apparatus as claimed in claim 11 wherein the inflatable structures are secured to one another by welding.

13. Apparatus as claimed in claim 1 wherein said at least one inflatable ring structure is of a rectangular form.

14. Apparatus as claimed in claim 1 wherein said at least one inflatable ring structure is made from a tubular structure.

15. Apparatus as claimed in claim 14 wherein a portion of the wall of said at least one inflatable structure comprises a gusset.

16. Apparatus as claimed in claim 15 wherein the gusset is located axially along an inside part of the rectangular ring structure.

17. An inflatable ring structure comprising a bend or corner wherein a portion of the tubular structure comprises a gusset.

18. An inflatable tubular structure as claimed in claim 17 wherein the gusset is arranged on the inside of the bend or corner of the tubular structure.

19. An inflatable tubular structure as claimed in claim 17 wherein the tubular structure comprises an upper shell panel, a lower shell panel and a gusset.

20. An inflatable tubular structure as claimed in claim 19 wherein the gusset is connected to the upper and lower shell panels such that the connection seams between the gusset and the panels are not located on the central axial line of the surface of the tubular structure.

21. An inflatable structure as claimed in claim 17 wherein the method of making the ring structure comprises connecting the ends of the gusset together to form a ring, placing the ring around a ring mould, attaching a lower shell panel below the mould and an upper shell panel above the mould, joining the gusset to both panels, removing the mould and joining the upper and lower shell panels together.

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